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EDWIN E. SLOSSON, Director
WATSON DAVIS, Managing Editor

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TROPICAL WEALTH

By Dr. Edwin E. Slosson
Director, Science Service, Washington, D.C.

I have just received the reports of the British Association for the Advancement of Science and am much struck by the contrast between the parent Association and the American Association for the Advancement of Science. In the British Association much more attention is given to the scientific aspects of the industrial and commercial development of the Empire than is customary in the American Association.

At the recent Oxford meeting the presidental address of the Section on Geography was given by the Hon. W. Ormsby-Gore, Member of Parliament and Under-Secretary of State for the Colonies, who spoke on "The Economic Development of Tropical Africa and Its Effect on the Native Population." He began by calling attention to the fact that "four million square miles of Africa lie within the British Empire. In fact there is more of the British Empire in Africa than in any other Continent. British North America and Australasia are both smaller in area than the African possessions of the Crown. Approximately three-quarters of this African area lie within the Tropics."

The advantages which Great Britain gets from her African dependencies is illustrated by a few of the figures that he gives. The domestic exports of Nigeria in 1921 were valued at $41,250,000,in 1925 they had risen to $85,000,000, more than double. In 1921 the Gold Coast products were valued at $30,000,000, in 1925 they were worth $52,500,000. These examples of expansion in West Africa are eclipsed by the rate of progress in East Africa. The domestic exports of Kenya and Uganda in 1921 were $11,250,000, in 1925 $39,100,000. What used to be German East Africa but is now re-christened Tanganyika Territory produced in 1921 products valued at $5,000,000, in 1925 these were $14,500,000. The two most sensational examples of the expansion have been cocoa in the Gold Coast and cotton in Uganda. The exportation of cocoa from the Gold Coast rose from 7,000 tons in 1905 to 78,000 tons in 1915 and 220,000 tons (nearly half the world's total supply) in 1925.

The peanut, which most Americans regard as merely a rival for popcorn as a midmeal nibble, is becoming in Africa a source of oil for shortening, for soap making and for Diesel engines. The export of peanuts from Nigeria was nothing in 1910 and 120,000 tons last year. These figures will serve to intimate the rich revenues which Great Britain is gaining from the African territories that she possessed before the war and which she has acquired from Germany through the war.

The United States is handicapped in comparison with her commercial rivals by

lack of tropical territory. England, France, Holland, and Portugal are far more fortunate in this respect. England has about a hundred times as much territory as the United States in tropical or semi-tropical climes; France has over 34 times; Holland and Portugal have each more than seven times as much as the United States.

CANCER TRANSPLANTED FROM MAN TO MAN

Cancer has been transferred from animal to animal but never until now has there been any authentic record of its being transplanted from person to person.

The theory that cancer has its origin in a germ, which has recently excited so much discussion in medical circles, has always received its principal setback from the fact that cancer is not contagious like the other germ-caused diseases. But now comes a report from France of the first known instance of what is apparently the inoculation of a medical attendant with cancer from a patient, and the medical world is greatly agitated.

According to details reported to the American Medical Association, a French medical student let fall a syringe in which he was collecting fluid from a wound left after an operation for breast cancer. The needle stuck in the palm of his left hand, carrying the cancer juice deep into the tissues. The student cauterized the wound himself and nobad effects were observed until two years after when there began to be pain in the hand and swelling at the point where the needle had penetrated. Later the glands in the armpit began to swell and were removed. A month after the operation, however, the local tumor showed up again and spread to the forearm. There was no longer any doubt of the malignant character ofthe growth so the whole arm was amputated at the shoulder. At the end of six months the patient was still free from any recurrence in any other part of the body.

The case is extremely important as the first one reported of an accidental cancer inoculation. The editors of the Journal of the American Medical Association, however, come out clearly with the statement that "the evidence is by no means convincing that this is a true instance of inoculation of cancer from man to man, for the reason that the cancer of the breast of the first patient was a carcinoma, while that of the medical student was a spindle cell sarcoma, not at all resembling the breast cancer."

"Had the growth been a carcinoma similar to that of the breast there would have been no room to doubt that it was an example of a transplant in a human subject," continues the editorial comment.

They argue that the cancer that was present in the hand might have arisen as a consequence of the wound from the needle and the more mechanical irritation set up by its contents, since it is well known that cancer follows in the wake of a bruise or irritation.

The American doctors admit that though the cancer in the hand was of a different type from that in the breast it does not exclude entirely the possibility that it was the result of implantation from the latter, since there have been instances in animal experiments in which both kinds of cancer have eventually developed from

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According to details reported to the American Medical Association, a French medical student let fall a syringe in which he was injecting fluid from a wound left after an operation for breast cancer. The needle stuck in the palm of his left hand, carrying the cancer juice deep into the tissues. The student contracted the wound himself and noted effects were observed until two years after when there began to be pain in the hand and swelling at the point where the needle had penetrated. Later the glands in the armpit began to swell and were removed. A month after the operation, however, the local tumor showed up again and spread to the forearm. There was no longer any doubt of the malignant character of the growth as the whole arm was amputated at the shoulder. At the end of six months the patient was still free from any recurrence in any other part of the body.

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transplants from the carcinoma type.

At any rate, the case is conceded to be the nearest thing to human cancer inoculation that has ever been observed and reassured us that cancer is not infectious in any ordinary sense since the proof of this one instance is open to question.

WHEAT BRAN STIMULATES GROWTH OF YOUNG

Grown folks with their ailments may do well to pass their breakfast bran to the children in the future. Tests at the U. S. Bureau of Chemistry with rats show that although wheat bran contains just the things the young need to grow on during their fastest growing period, it does not have the power to keep up normal development in the mature. Joseph C. Murphy and Dr. D. Breese Jones, who attempted in their experiment to settle the much disputed question of bran as a food, call attention to the fact that this is striking evidence that living creatures at one time of their lives may require entirely different sort of food than at another time.

Wheat bran has long been known as an excellent food for farm animals with long digestive tracts well adapted for hay and fodder, but its food value has been disputed for other animals and particularly for man.

"The rate of growth of rats and their gain in weight on a bran diet, however, show conclusively that the bran proteins must be well digested and assimilated, and that the ability to digest the proteins in crude bran is not limited to the cow and other ruminants as is frequently claimed," Mr. Murphy said.

Whole wheat , which includes the white starchy portion, the bran covering and the germ, contains practically all the protein substances necessary for human and animal growth and development. The bran portion alone, however, contains more than twice as much of the nutritionally essential amino acids as does the white flour portion of the grain. The wheat endosperm, which is the white flour of commerce, contains proteins which are mainly gliadin and glutenin, and differ from those of the bran.

Rats fed on a diet containing commercial wheat bran as the source of protein grew very satisfactorily during the first fifteen to eighteen weeks or until early maturity. When the bran was washed free of all white flour clinging to it the rate of growth was less. When five per cent, of the ration was replaced by white flour better results were obtained. This can be accounted for in two ways, Mr. Murphy says.

"Either there may be present in the white flour some nutritionally essential factor which is either deficient or lacking in the plain bran, or that during the washing there are removed not only the white flour clinging to it but also considerable of the valuable proteins themselves. That the latter is the case is proved when white flour is substituted entirely for the bran, for then the animals gain during the first fourteen weeks only one-half to two-thirds as much as they gain on the unwashed bran.

"It is of interest to note that the animals on the bran diet grow much faster compared to the normal rate during the first fourteen weeks than later. But after that the animals do but little better than maintain their body weight in most cases," Mr. Murphy said. "But those fed on the white flour on the other hand grow so uniformly that at the end of thirty-six weeks, most of them weigh more than the rats that are onthe bran diet the whole time.

"It appears that the wheat bran contains an abundance of substances that meet the animal's nutritional needs at the time of greatest growth, but is lacking in other substances that are necessary for the animal's normal development after it has reached maturity," he explained. "For the white flour, although unsatisfactory for the younganimal , satisfies to a better degree the requirements of the mature."

"Rats fed the bran diet only produce young occasionally and they have little success in rearing them," he added. "Fecundity is low. Only two of a lot of five females gave birth to young. That unsatisfactory reproduction of young may be due to the same dietary deficiencies as those which cause the unsatisfactory development of the rats after they attain maturity, is an interesting possibility, which further research may determine," Mr. Murphy said.

RAIN AND SNOW FERTILIZE SOIL

Rain and snow water the fields and meadows, but not many people know, says Dr. Frank T. Shutt, Dominion chemist of the Canadian Department of Agriculture, that they also fertilize the soil. They wash down out of the air and into the earth enough nitrogenous substances to make a real difference in the farmer's fertilizer bill. In the vicinity of Ottawa, the amount of such fertilizer added free of charge to the soil each year has been measured and found to be equivalent to 44 pounds of expensive imported Chile saltpeter per acre. There is then after all a pot of gold at the rainbow's end, at least for the farmer.

"The Canadian experiment," Dr. Shutt said, "covered a period of seventeen years and has given valuable information on the part played by rain and snow in maintaining soil fertility. Precipitation also plays an important role in purifying the atmosphere, and the Ottawa experiment has approximately measured the extent of this useful work."

Every rain and snow fall for seventeen years that yielded enough for experimentation was analyzed, Dr. Shutt explained, and the amounts of free ammonia, nitrates, nitrites, and albuminoid ammonia were measured. These are the forms in which the sort of nitrogen of the air which can be assimilated by plants as food occurs.

Although air is normally four-fifths nitrogen itself, it is only the small quantities of this substance already in combination with other chemical elements that are of use to plant life. The enormous quantity of nitrogen gas in the air is useless, and plants may starve for nitrogen while immersed in an atmosphere of it.

The "combined" forms of nitrogen enter the air in various ways, Dr. Shutt says. Plant and animal matter contains nitrogen, and ammonia gas forms and goes into the atmosphere when these decompose. Smoke from houses and factories spills its compound, nitrogen into the air, and lightening bolts in thunderstorms smash atoms of hydrogen and nitrogen together to form ammonia, just as the difficult electrical "arc process" does in the man-made laboratory. These substances are sooner or later washed out of the air into the soil.

Most of the combined nitrogen of the air occurs as free ammonia, and this is always much larger after forest or bush fires. There has also been a steady increase in recent years in ammonia in the air, Dr. Shutt said, because of the increased use of soft coal.

The amount of total nitrogen brought down to the soil out of the sky each year varies greatly, according to Dr. Shutt, and it is not always possible to account for the variations. Around Ottawa the average amount of nitrgen thus added to the soil is from six to seven pounds per acre in a year. During one year this amount jumped to more than eleven pounds, andthis was believed to be due to the new factories in the vicinity.

Snow is decidedly poorer in nitrogen than rain, it was found. It carries only one half as much free ammonia and also considerably less of the other nitrogen compounds. Snow carries only about half as much useful nitrogen as an equal amount of rain, and as there is more rain than snow during the year rain contributed nearly six pounds of nitrogen to the soil while snow gives a little more than one pound.

FLORIDA THOUGHT MOST FAVORABLE SITE FOR ANCIENT MAN IN AMERICA

If an American museum is ever able to boast of a skeleton rival to the famous Cro-Magnon and early cave men remains of Europe it will probably be known asthe Florida man.

"If there is any place where early man is likely to be found in America it is in Florida, south of the territory reached by the great ice sheet," Prof. Henri Ami, well known Canadian paleontologist,has declared.

Prof. Ami, who is a member of the faculty of McGill University at Montreal, is at present engaged in exploration of the famous caves in the region around Dordogne in the south of France. He made the above statement to a representative of Science Service at a recent meeting of the French Association for the Advancement of Science at Lyon, in commenting on the question much mooted among scientists, as to whether primitive man existed on the continent of North America as early as he did in Europe.

The Canadian scientist likened the Caribbean Sea to the Mediterranean, the cradle of Eurasian civilization, and Florida to the peninsulas of Greece and Italy. The same favorable conditions for early development of man existed in Florida, he said, as prevailed in southern Europe.

The animal remains unearthed during recent excavations conducted by the Smithsonian Institution near Vero and Melbourne, Florida, indicate, added Prof. Ami, that the scene of present day real estate booms may have been continuous with the South American continent. Bones of armadilloes, crocodiles, tapirs and rhinoceroses, all characteristic animals of the tropics, some of whose relatives still roam the Amazon jungles, have been found in this region.

Among the remains of greatest interest, according to the Canadian savant, are bones representing four distinct types of the horse that became extinct ages before the Spaniards introduced the domesticated horse of the Old World on either continent.

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Prof. Ami, who is a member of the faculty of social University at Ottawa, spent several months engaged in exploration of the Indian mounds in the region around Pensacola, Fla., and made the above statement to a representative of Science Service at a recent meeting of the French Association for the Advancement of Science at Lyon, in connection with the international meeting of anthropologists.

Ancient Florida was related on the continent of North America as early as another primitive man existed on the continent of Europe, he said, as previous in southern Europe.

The Canadian scientist linked the cultures of the Mediterranean, the cradle of European civilization, and Florida as the possible home of Cro-Magnon and Italy. The same favorable conditions for early development of man existed in Florida, he said, as prevailed in southern Europe.

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Among the remains of extinct animals, according to the Canadian savant, are bones representing four distinct types of human beings who seem certainly to have lived before the Spaniards introduced the domesticated horse for the Old World on either continent.

PROFESSIONAL OCCUPATIONS DO NOT HARM WOMEN'S HEALTH

Women factory workers have always received their full quota of medical solicitude, but now the health status of the women in the brain working professions comes in for its share of attention.

Taking a group of teachers as typical subjects for observation, Dr. Letitia Fairfield, formerly medical director of the Women's Royal Air Force, declares there is no reason to believe the occupation of these women has had any harmful effect on their health.

Women, she says, start out in their working careers with slight initial handicaps in the shape of a higher sickness rate in all the diseases than men. They have a liability to a special group of ailments of their own and a tendency to age sooner and more rapidly than men.

"Nevertheless," maintains Dr. Fairfield, "my conclusion is that all these handicaps have been exaggerated and can be considerably reduced by improved hygiene."

Men have always been more sensible than women in the matter of clothes, exercise and diet but every year the feminine attitude toward these matters becomes more intelligent. "Without undue optimism," she says, "it seems reasonable to consider that preventive medicine has yet much to contribute to the problem of maintaining the physical efficiency of the professional woman."

"SINGING WALLS" MAY HELP AUDIENCES

Live walls, resonant like the sounding box of a violin, instead of dead walls of plaster or hard walls of stone or brick are the latest architectural device to save audiences from straining their nerves and orators from shouting themselves hoarse. Emile Berliner, the father of the "mike" used in telephone and radio and of the modern disk talking machine, is now turning his efforts toward the solution of the problem of hearing in large halls. He has developed a new type of wall tile made of porous elastic cement that he claims has acoustic properties better than those of stone, brick, or common concrete and equal to that of wood.

"Many churches, theatres and concert halls where sounds are so deadened as to become almost inaudible, or where the boomy reverberations cause confusion," said Mr. Berliner, "could be easily corrected by covering sections of their interiors with these acoustic tiles to a sufficient height to catch and reflect the voices of speakers and singers and the sounds of instruments."

There is no great secret involved in the new invention. Ordinary concrete is merely mixed with certain amounts of such porous materials as asbestos, sawdust, or powdered pumice stone. The resulting concrete has "life" or elasticity like wood.

Bad acoustics in buildings are usually due to two causes; either sounds are absorbed by inelastic walls and a speaker in a large hall has to shout to be heard at all, or else the hard stone or brick or concrete walls form a reverberating chamber that adds its own vibration to those of the speaker's voice. Wooden walls have always been found to have good acoustical properties, and Mr. Berliner reached the conclusion that it was the elastic or vibratory character of wood itself that was responsible.

A volume of air wholly or nearly enclosed by rigid walls has a rhythmic vibration of its own like that of an organ pipe and will resound or reverberate when the air-body is agitated, Mr. Berliner explained. The harder or more rigid the walls are which enclose an air-body the more intense will be its reverberations or the tone it may produce. An air-body having elastic walls does not have the organ-pipe properties, and reverberations will be lacking. The resonance of the walls, on the other hand, will increase the sound. A violin with a glass or metal box will reverberate a note of its own and cause a jumble of sounds while a wooden Stradivarius will reproduce the sounds made by the bow on the strings with marvelous clearness.

LABORER FLIPS CHEESE AND IMPROVES PHONOGRAPH

The story of how an Italian laborer, seated on a box eating his lunch in a plating plant, made a lasting contribution to his employer and to science, is told by Dr. William Blum, chemist of the U. S. Bureau of Standards and president of the American Electrochemical Society.

Officials of the company in question, makers of phonograph records, upon noting a marked increase in the hardness of the copper disks from which phonograph records are stamped, subsequently sent samples of the plating bath for analysis, which revealed that organic matter was present.

At a complete loss to explain the presence of any foreign matter in their electrolytes used for depositing copper electrically, a careful inquiry developed the fact that an Italian laborer had playfully flipped a piece of cheese at a fellow worker, the cheese missing its mark and falling into the tank where the metallic disks containing phonographic records were being deposited. The phonograph company found that the hardening effect was due to the casein in the cheese, which material they therefore have continued to add to their solutions. The increased hardness of the copper allows a considerable saving because more records can be stamped in molten wax from the harder disks.

CHANCE DISCOVERIES PROVIDE ROMANCE OF SCIENCE

Romance through accident and chance still pervade science in this age of painstaking research, recent events in the laboratories of two great industrial concerns show, and research workers may still start out on a voyage of discovery, even as Saul of Judea started out to find an ass but found a kingdom.

During experiments a few days ago at the Wilmington plant of the E. I. Du Pont de Nemours Company, research on a new quick-drying finish for automobiles and furniture was at a stand-still because the liquid persisted in "setting" into a jelly. As an experiment some caustic soda had been added to the mixture preparatory to placing it in a mixer. Upon starting the mixer the machinery broke down, and as several days were required for repairs the material was covered over and set aside. When the cover was removed a few days later, the chemists were astonished to find that the pasty material, presumably through a rearrangement of its molecular structure, had become almost as thin as water; here, practically in its finished form, was the product for which they had long been seeking.

At another plant, in the research laboratories of General Motors, tests were

being conducted to determine the cause of knocking in gasoline motors. One of the chemists conceived a brilliant idea; possibly knocking in motors was due in some way to the colors present inside the cylinder during combustion. Going to the chemical storeroom, he asked for some colored chemical soluble in gasoline. Out of some 10,000 at hand, the storekeeper gave him iodine, the only chemical in the lot which had the property of eliminating knocking ! The color guess was wrong; but due to the happy circumstance of picking up iodine it was possible to solve the riddle of knocking in gasoline motors, and to work out the theory of anti-detonants which, it is believed, will bring about revolutionary changes in the design of internal combustion engines.

SCIENTIST FINDS GOOD FAMILIES DEVELOP SLOWLY

Noble characters are not always passed on along with noble names and ivied towers. Thurkill Cooke, who spoke before the British Association for the Advancement of Science recently has traced the biological workings within the peerage by studying the pedigrees and records of a large number of titled families in order to learn whether the caste system helps or hinders the inheritance of desirable qualities.

A good family, Mr. Cooke said, is a matter of slow growth. Sudden acquisition of money or power or elevation in social rank seldom creates good families because the adaptive equilibrium of its members is upset. The result is often reversion to the original ancestral level. Families of quality that have a firmly founded homogeneous social background stand a better chance of remaining "quality folks" than families whose ancestors are mixed from different social levels. Noble families keep their distinctive qualities more readily if their environment is good and tradition strong.

The harmful things that happen within the charmed circle of the peerage are due mostly to inferior blood that seeps into the titled ranks and to enforced intermarriages with inferior stock. These factors are threatening the rich ancestral strains with decadence and extinction, Mr. Cooke said.

The Indians taught early settlers in America to drop a fish into each hill of corn for fertilizer.

Oranges and grapefruit may grow on the same tree if a scion of one kind of tree is budded on the other.

Eskimos kill polar bears by spearing them with a harpoon or knife lashed to the end of a pole, after which the bears are run down on foot with the help of dogs.

SCHOOLROOMS SHOULD BE COLORFUL, SAYS EXPERT

So many children learn next to nothing, or worse, about colors and beauty in their drab homes that it is up to the school teachers to develop their interest and taste in color. This is the conclusion of Mary Polsen, of the Kansas State Agricultural College, following a number of experiments in color appreciation among 1,000 school children of Indiana and Illinois.

Children from poor homes show the least ability to distinguish between slight variations in color, and the boys are less sensitive than the girls, Miss Polson finds. She urges that since color is deficient in so many homes, it is important to provide it in the schools. She also believes that a teacher should find out by tests the colors that are most popular in her class, and should consider the children's color preferences when she selects pictures, gives a painting lesson, or uses color in other ways.

In the tests made, Miss Polson found that more than half the school children could not distinguish twelve variations in the hue of a color. The children preferred most warm colors, such as red, orange, and pink, but yellow was consistently unpopular. Blue gained popularity as the ages of the children advanced. Intense and striking color combinations were most popular, except that among the older boys a preference for darker colors began to be evident.

PRAIRIE-DOGS HAVE LANGUAGE ALL THEIR OWN

Recent observations of a colony of prairie-dogs at the National Zoological Park in Washington are reported by the naturalist Ernest Thompson Seton in a recent issue of the Journal of Mammalogy.

In eating, says the author, the animals sat up on their hindquarters and held the food in one paw. At first, all seemed to be righthanded, but later one was seen to eat with the left hand. When meeting a friend they saluted by "kissing", that is, with both snouts near the ground, each rubbed its lips first on one side and then on the other of its friend's muzzle. Many of them had a trick of nibbling each other's tail around the root. Somtimes a persistent one would pursue another around the cage until he turned to fight. One or two had lost parts of their tails.

Apparently these little animals have a language. Upon becoming alarmed the tail jerks once or twice as a warning to their fellows; then follows the ordinary "quek" or bark for which the prairie-dog is named. Also when one gave a sharp "squit-tuck" all ran for cover. The note "skr-skirr" means fight; it was frequently heard when the animals were fussing among themselves. They had in addition a number of definite squeaks and chatters used in "common conversation."

The most singular vocal exercise of all was the song. This was uttered by the old ones of either sex, at any time, without obvious cause. Suddenly one would rear up and with snout to the skies, utter a soft "woo-oo", then drop down again onto all four feet.

TABLOID BOOK REVIEW

JUNIOR MATHEMATICS - BOOKS ONE, TWO AND THREE: by Ernst R. Breslich. New York, The Macmillan Company , 1925-6. 279 pp., 264 pp. & 254 pp.

General science has long been common in our senior and junior high schools, and in these three books the author provides for a junior high school course in general mathematics. The advantages, in principle, of such a procedure are the same as those of general science, and these books fully realize these advantages. The student is led into arithmetic and some geometry in the first book, some solid geometry and algebra in the second and elementary trigonometry, and somewhat higher algebra in the third. The latter also introduces him to logarithms and the slide rule. But this division is only approximate, for throughout, the idea of mathematics in general is kept constantly to the fore, and, for example, algebraic methods of expression are continually used. As this is all done with frequent reference to practical applications, the student who completes the three books should be well grounded mathematically, either for his daily life or for a basis for further and more detailed mathematical study in senior high school or college.

MAMMALS OF THE CHICAGO AREA. By Colin C. Sanborn. Chicago: Field Museum of Natural History. 1925

This very interesting 23-page pamphlet is the eighth of a series of brief popular treatises on zoology issued by the Field Museum. It is brightly written, and well illustrated with numerous little sketches of the animals, done by an artist who evidently knows his business. Series of this sort on local faunas and floras are among the best things that museums in this country can do to promote a lively and intelligent interest in natural science.

ICE AGES, RECENT AND ANCIENT. By A. P. Coleman. New York: The Macmillan Company. 1926 $4.00

In the long drama of geology, there are few acts more interesting to the average well-informed person than the ice ages, periods of hush and awe, when the inexorable advance of the creeping cold hangs over the scene like the shadow of the Fates in an old Greek play. Dr. Coleman's book records admirably the many times this act has been repeated on the stage of the earth, from its most recent occurrence in the Pleistocene, when early Man was one of the protagonists, back to the almost unimaginable antiquity of the pre-Cambrian ages.

The noise of the eruption of the Volcano Krakatoa, in 1883, was heard in some places almost 3,000 miles away.

A rat poison which is less dangerous to human beings and domestic animals has been developed by government experiments.
